

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of: Phadnis *et al.*

Appl. No.: 09/785,884

Art Unit: 2152

Date Filed: February 15, 2001

Examiner: Lesniewski, Victor D

For: Aggregation Devices Processing  
Keep-alive Messages of  
Point-to-point Sessions

Attorney Docket No.: CSCO-002/94701

**Appeal Brief Under 37 CFR § 41.37**

Mail Stop **Appeal Brief - Patents**  
Commissioner for Patents  
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Alexandria, VA 22313-1450

Sir:

In response to the Final Office Action mailed 17-Oct-2006 and further to the Second Notification of non-compliant appeal brief date 25-July-2007, Appellants submit this appeal brief under 37 CFR § 41.37.

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No additional fees is believed to be due beyond those already paid for. However, the USPTO is directed to charge all required fees (except for the issue fees and the publication fees) to process the pending appeal and credit any overpayments to Deposit Account No.: 20-0674. A duplicate copy of this sheet is enclosed.

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## I. REAL PARTY IN INTEREST

This application is assigned to Cisco Systems Technology, Inc., by virtue of the assignment recorded on 02/15/2001 at Reel/Frame: 011560/0452.

## II. RELATED APPEALS AND INTERFERENCES

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None.

## III. STATUS OF CLAIMS

### A. Pending Claims

Claims 1-50, 59, 60 and 67-85 are pending. Of these, claims 1, 10, 15, 21, 25, 30, 37, 42 and 47 are independent claims.

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### B. Rejections

All the claims 1-50, 59, 60 and 67-85 were rejected.

In particular, claims 79, 80, and 82 were rejected under 35 U.S.C. § 112, second paragraph, allegedly as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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Claims 1-4, 8-10, 14-16, 21-23, 25, 29, 30, 35-40, 42, 46-50, 59, 60, 69, 72, 75, and 78-85 stand rejected under 35 U.S.C. § 103(a) allegedly as being unpatentable over U.S. Patent Number 6,721,334 issued to Ketcham (hereafter "Ketcham") in view of U.S. Patent Number 5,781,726 issued to Pereira (hereafter "Pereira").

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Claims 5-7, 11, 13, 17-19, 24, 26, 28, 31, 32, 34, 41, 43, and 45 stand rejected under 35 U.S.C. § 103(a) allegedly as being unpatentable over Ketcham further in view of Pereira and U.S. Patent Number 5,964,837 issued to Chao *et al* (hereafter "Chao").

Claims 12, 20, 27, 33, and 44 stand rejected under 35 U.S.C. 103(a) allegedly as being unpatentable over Ketcham in view of Pereira, Chao, further in view of "RFC 1661: Point-to-Point Protocol," dated July 1994, to Simpson *et al* (hereafter "Simpson").

Claims 67, 68, 70, 71, 73, 74, 76, and 77 were rejected under 35 U.S.C. 103(a) as being unpatentable over Ketcham in view of Pereira, further in view of "An RTF Payload Format for User Multiplexing," May 1998, Rosenberg *et al* (hereinafter referred to as "Rosenberg").

### **C.Appealed Claims**

All the pending claims 1-50, 59, 60 and 67-85 are subject of this appeal.

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### **IV. STATUS OF AMENDMENTS**

The amendment after final rejection under 37 CFR § 1.116 dated January 16, 2007 has been entered per the advisory action dated 02/01/2007. Thus all amendments have been entered.

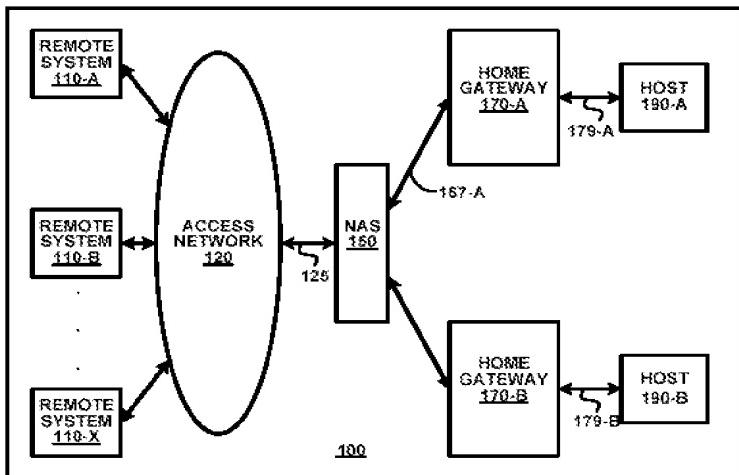
## V. SUMMARY OF CLAIMED SUBJECT MATTER

For ease of understanding of the Honorable board, the claimed subject matter is explained using examples with respect to Figure 1 of the subject patent application.

The subject matter of the application generally pertains to an environment in which point to point sessions are set up between end systems (e.g., personal computer systems at homes and termination devices).

Thus in a first scenario of Figure 1, remote systems 110-A through 110-X constitute end systems and home gateways 170-A and 170-B constitute termination devices. In a second scenario, hosts 190-A and 190-B constitute end systems and NAS 150 constitutes a

termination device. The claimed subject matter is explained below with respect to the first scenario (and with respect to keep alive messages, explained below, from remote systems 110-A through 110-X) merely for simplicity.



**FIG. 1**

Remote systems 110-A through 110-X send keep-alive messages to home gateways 170-A and 170-B typically to check the status of the end to end connection supporting respective sessions. The keep alive messages causes overhead on various communication links and devices contained in backbone paths 157A connecting NAS 150 to home gateways 170-A and 170-B.

Various aspects of the present invention enable that such overhead to be reduced.

Turning to pending claim 1, the features are broadly described with respect to NAS 150 of Figure 1, which processes the keep-alive messages generated end systems (remote systems 110-A through 110X of Figure 1). The claimed receiving of keep-alive messages from the end systems is described, for example, in step 210 of Figure 2 and described in lines 5 10-11 of page 8 of the specification.

NAS 150 generates an aggregated request packet which includes data indicating that the status of the PPP sessions is requested (element 220 of Figure 2 and lines 11-14 of page 8 of the specification). An example packet format for such data included is described in page 9 line 9 to page 10 line 14 of the subject specification.

10 NAS 150 then sends the generated aggregated request packet to a peer aggregation device (home gateway 170-A of Figure 1). This is supported at least by element 240 of Figure 2 and the related description on lines 15-19 of page 8 of the specification.

15 As a single aggregation packet is sent to home gateway 170-A (instead of multiple packets, with each packet representing a corresponding keep alive message), the overhead on path 157A is reduced in the illustrative example.

Gateway 170-A (of Figure 1) may process the received aggregation packet according to independent claim 10 or dependent claim 2.

20 Thus, with respect to independent claims 10, home gateway 170-A (of Figure 1) examines an aggregated request packet to determine that the status of the specific point-to-point sessions requested. Home gateway 170-A determines the status of each of such point-to-point sessions and generates an aggregated reply packet indicating the status of each of such point-to-point sessions. The feature is supported, for example, by reply generator 440 of Figure 4 and related description on lines 15-18 of page 14 of the specification.

25 The aggregated reply packet is then sent back to NAS 150 (lines 19-20 of page 14 of the specification) in the illustrative example.

Some of such features are recited in dependent claims 2 and 3. Again, since a single aggregated reply packet is sent, overhead on path 157A is reduced.

Dependent claim 4 relates to sending a proxy keep-alive reply message to the end systems originating a corresponding keep alive-messages without waiting for the aggregated reply packet. Claim 5 recites the use of a status table which facilitates such a feature. Support for the two claims is supported at least by the combination of keep-alive processor 330, proxy reply 340 and remote status table 341 of Figure 3 and described in further detail in page 11 line 4 through page 12 line 12 of the specification.

Claim 67 is dependent on independent claim 1, and recites that the aggregated request packet contains less data than the data forming the keep-alive messages together. Less data may be contained in scenarios when the aggregated request packet is not generated merely by aggregating the packets containing the individual keep-alive messages. Support for this feature is provided, for example, at line 19 page 9 through line 14 page 10 of the specification).

Claim 68 is dependent from claim 67 and defines the manner in which such less data may be included in the aggregated request packet. In particular, claim 68 recites that each keep-alive message contains an identifier of a corresponding PPP session, and that each identifier is selected from the keep-live message (line 19 page 9 through line 14 page 10 of the specification). The aggregate request packet is formed from such identifiers. As a result, the aggregated request packet contains less data than the plurality of keep-alive messages together.

Claim 79 is dependent from claim 1 and recites that the elements of claim 1 are implemented in an aggregation device implemented as a single unit, which is supported by both Figures 1 and 3. Support for claims 80-85 is found similarly.

Claim 11 is dependent from claim 10 and recites determining the status of a point-to-point session using a local status table which contains the status information of at least some

of the point-to-point sessions, and is supported by local status table 441 and reply generator 440 of Figure 4, and the related description on lines 15-18 on page 14 of the specification.

Independent claim 15 operates similar to claim 1, but recites structures providing the related functionality in substantial respects. The claim recites an input interface (310 of Figure 3 and lines 4-5 on page 11), message aggregator (370 of Figure 3 and related description and lines 13-17 on page 12) and an output interface (360 of Figure 3 and related description in lines 8-9 of page 13).

With respect to independent claim 21, the aggregation device is generally supported by NAS 150 of Figure 1. The claimed means for receiving keep-alive messages is supported at least by (210 of Figure 2, description in lines 10-11 of page 8 of the specification, and 310 of Figure 3 and lines 4-5 on page 11), the claimed means for generating is supported by (element 220 of Figure 2 and lines 11-14 of page 8 of the specification, 370 of Figure 3 and related description and lines 13-17 on page 12, and page 9 line 9 to page 10 line 14) and the claimed means for sending by (360 of Figure 3 and related description in lines 8-9 of page 13).

With respect to independent claim 25, home gateway 170-A (of Figure 1) processes an aggregated request packet. The claimed means for examining, means for updating and means for generating are supported at least by Figure 4 and the related description on line 17 of page 13 through line 1 on page 15 of the specification.

Independent claim 30 operates similar to claims 10 and 25, but recites structures providing the related functionality/actions. The claim recites an input interface, a de-encapsulator, a reply generator, and an output interface, which are all shown in Figure 4 and further supported at least by the description from page 13 line 16 through page 15 line 1 of the specification.

With respect to independent claim 37, the aggregation device is generally supported by NAS 150 of Figure 1 and the computer readable medium is supported at least by RAM

520 and the secondary storage 530. The claimed receiving keep-alive messages is supported at least by (210 of Figure 2, description in lines 10-11 of page 8 of the specification, and 310 of Figure 3 and lines 4-5 on page 11), the claimed generating is supported by (element 220 of Figure 2 and lines 11-14 of page 8 of the specification, 370 of Figure 3 and related description and lines 13-17 on page 12, and page 9 line 9 to page 10 line 14) and the claimed sending by at least (360 of Figure 3 and related description in lines 8-9 of page 13).

With respect to independent claim 42, home gateway 170-A (of Figure 1) processes an aggregated request packet and the computer readable medium is supported at least by RAM 520 and the secondary storage 530. The claimed examining, generating and sending are supported at least by Figure 4 and the related description on line 17 of page 13 through line 1 on page 15 of the specification.

10 Claim 47 recites a first aggregation device (NAS 150 of Figure 1) and a peer aggregation device (home gateway 170-A). The claimed features of the first aggregation device are supported at least by Figure 2 and the related description on Line 5 page 8 through line 5 on page 9. The claimed features of the peer aggregation device are support at least by Figure 4 and the related description on line 17 of page 13 through line 1 on page 15 of the specification.

**VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

(A) Whether the rejection of claims 79, 80, and 82 under 35 U.S.C. § 112, second paragraph, is proper.

(B) Whether claims 1-4, 8-10, 14-16, 21-23, 25, 29, 30, 35-40, 42, 46-50, 59, 60, 69, 72, 5 75, and 78-85 are unpatentable under 35 U.S.C. § 103 over U.S. Patent Number 6,721,334 issued to Ketcham (hereafter "Ketcham") in view of U.S. Patent Number 5,781,726 issued to Pereira (hereafter "Pereira").

(C) Whether claims 5-7, 11, 13, 17-19, 24, 26, 28, 31, 32, 34, 41, 43, and 45 are unpatentable under 35 U.S.C. § 103 over Ketcham further in view of Pereira and U.S. Patent 10 Number 5,964,837 issued to Chao *et al* (hereafter "Chao").

(D) Whether claims 12, 20, 27, 33, and 44 are unpatentable under 35 U.S.C. 103(a) over Ketcham in view of Pereira, Chao, further in view of "RFC 1661: Point-to-Point Protocol," dated July 1994, to Simpson *et al* (hereafter "Simpson").

(E) Whether claims 67, 68, 70, 71, 73, 74, 76, and 77 are unpatentable under 35 15 U.S.C. § 103 over Ketcham in view of Pereira, further in view of "An RTF Payload Format for User Multiplexing," May 1998, Rosenberg *et al* (hereinafter referred to as "Rosenberg").

## VII. THE ARGUMENT

### VII. A. Rejection Under 35 U.S.C. § 112 - Claims 79, 80 and 82

Claims 79, 80, and 82 under rejected under 35 U.S.C. 112, second paragraph, allegedly as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In particular, the Examiner objects to the following representative claim language:

... sending said aggregated request packet to a peer aggregation device. (Claim 1, as amended)

... wherein said receiving, said generating and said sending are performed in an aggregation device implemented as a single device. (Claim 79, Depending from claim 1)

In rejecting the claims under 35 U.S.C. § 112, it was stated:

... This clause makes the claims indefinite as it states that the sending step is performed in the aggregation device. In order to perform the step of "sending said aggregated request packet to a peer aggregation device" in a single aggregation device, the aggregation device would also have to include the peer aggregation device. This, of course, **is nonsensical and is inconsistent with the applicant's disclosure and other claim language**. Thus, the scope of claims 79, 80, and 82 is unclear.

(Page Final Office Action Dated 10/17/2006, **Emphasis Added**)

Appellants respectfully submit that sending from an aggregation device to a peer aggregation (as claimed) does not require the aggregation device to include the peer aggregation device. Sending merely requires a packet content and/or initiation of transmission in a specific direction/interface such that the packet would eventually reach the peer aggregation device.

As also noted in MPEP § 2173.02, the test for definiteness under 35 U.S.C. 112, second paragraph, is whether "those skilled in the art would understand what is claimed when the claim is read in light of the specification." *Orthokinetics, Inc. v. Safety Travel Chairs, Inc.*, 806 F.2d 1565, 1576, 1 USPQ2d 1081, 1088 (Fed. Cir. 1986). The legal standard for definiteness is whether a claim reasonably apprizes those of skill in the art of its scope. *See In re Warmerdam*, 33 F.3d 1354, 1361, 31 USPQ2d 1754, 1759 (Fed. Cir. 1994). In

determining whether this standard is met, the definiteness of the language employed in the claim must be analyzed, not in a vacuum, but always in light of the teachings of the prior art and of the particular application disclosure as it would be interpreted by one possessing the ordinary level of skill in the pertinent art. *In re Johnson*, 558 F.2d 1008, 1015, 194 USPQ 187, 193 (CCPA 1977).

The observation of the Examiner that the purported construction is "nonsensical" and "inconsistent with the applicant's disclosure", leads to the conclusion that one skilled in the relevant arts having the benefit of Appellant's disclosure would not interpret the claim language as alleged by the Examiner.

To the contrary, it is asserted that a skilled practitioner reading the appellant's disclosure would interpret the claim language as noted above.

The appellants respectfully request this Board to overturn the rejection under 35 U.S.C. § 112. In the alternative, the Appellant respectfully invites this Board or the Examiner to suggest acceptable alternative language consistent with the interpretation provided by the Appellant above.

## **VII. B. Rejection Under 35 U.S.C. § 103(a) - Independent Claims 1, 15, 21, 37**

Claims 1, 15, 21, and 37 stand rejected as being unpatentable under 35 U.S.C. § 103 over Ketcham in view of Pereira. The Appellant requests the Board overturn these rejections.

For conciseness, the argument is presented with reference to claim 1 only. However, the arguments are applicable to claims 15, 21, and 37 as well.

### **Applicable Law**

MPEP § 2143 sets forth the basic requirements for establishing a *prima facie* case of obviousness under 35 USC § 103 (a). To establish a *prima facie* case of obviousness, three basic criteria must be met.

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First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

### **Appellant's Positions Broadly**

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The Examiner also appears to agree that the references do not individually teach one or more features of claim 1. However, the Examiner relies on the combined operation of Ketcham and Pereira for such features under 35 U.S.C. § 103 (a).

In so combining, the Examiner has not met the burden of establishing a prima facie case of obviousness for at least one of the following reasons:

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P1. The Examiner has not specifically set forth on record how embodiments constructed from the combined teachings of Ketcham and Pereira would operate akin to the features of claim 1;

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P2. The Examiner has not set forth why a skilled practitioner would combine the combined teachings of Ketcham and Pereira to form such embodiments, without the benefit of the disclosure of the Appellants;

P3. It is Appellant's position that, as a threshold matter, there are facts within the possession of a skilled practitioner which would dissuade the skilled practitioner from combining Ketcham and Pereira as in claim 1.

Appellant now point to some of the relevant facts from Ketcham and Pereira.

**Details of References**

Ketcham generally relates to packet aggregation in packet-based networks. In an example there, the method determines the route for a received packet to see if the route supports aggregate packets. When another packet is received over the network, the route of the packet is determined. If the route shares at least one common destination with the first packet and that destination supports aggregate packets, an aggregate packet is created including the first packet and the second packet.

On the other hand, Pereira relates to optimizing and reducing the polling traffic needed to maintain the connection oriented sessions across a common link between edge devices. At a first edge device, a member of a set of connection oriented sessions is selected as a polling session. Request polling traffic of that polling session is forwarded from a first edge device to the second edge device. **All other polling traffic from other members of the set of connection oriented sessions is blocked at the first edge device.** The set of connection oriented sessions is maintained in response to polling traffic of the selected polling session.

**Support for the Positions**

With respect to P1 noted above, the Examiner has not set forth clearly how embodiments constructed from the combined teachings of Ketcham and Pereira would operate akin to the features of claim 1.

With respect to P2 noted above, to meet the initial burden of establishing prima facie case, the Examiner also has to set forth why a skilled practitioner would choose the specific manner in which the Examiner combines the teachings. As the burden of P1 is not believed to be met, the burden of P2 is also not believed to have been met.

It is well settled that the mere fact that references could be combined is not sufficient to establish a prima facie case of obviousness. *In re Mills*, 16 USPQ2d 1430 (Fed. Cir. 1990).

With respect to P3 above, one skilled in the relevant arts would be in possession of the fact that the approach of Pereira would block polling traffic of all but one connection oriented session across a common link.

As the technique of Pereira is an alternative technique to the claimed invention, it 5 would lead away from the claimed invention. The technique of Pereira is an alternative technique to a similar problem as in claim 1 since Pereira transmits polling traffic related to a single session while blocking the polling traffic related to other sessions to the same destination.

This is a fact the Patent Office cannot ignore in determining sufficiency of motivation 10 to combine the references under 35 U.S.C. 103(a). A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. W.L. Gore & Associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984) (MPEP Section 2143.02. VI, Emphasis Added).

15 In sharp contrast, independent claim 1 recites that "... aggregated request packet ... includes data indicating that the status of said PPP sessions is requested". In other words there is express data in the aggregated request indicating that the status of the PPP sessions is requested.

20 Due to the blocking feature of Pereira, one skilled in the relevant arts would not be motivated to include (in the aggregation packet of Ketcham) data indicating that the status of multiple sessions is requested in the aggregated packets of Ketcham.

Given the fundamental differences of approaches of Pereira and the invention of claim 1, one skilled in the relevant arts would not be motivated to combine the techniques of Pereira with Ketcham to render claim 1 obvious under 35 USC 103 (a).

**VII. C. Rejection Under 35 U.S.C. § 103(a) - Dependent Claims 2, 38, 47**

Claims 2, 38 and 47 stand rejected as being unpatentable under 35 U.S.C. § 103 over Ketcham in view of Pereira. The Appellant requests the Board to overturn these rejections.

For conciseness, the argument is presented with reference to claim 2 only. However,  
5 the arguments are applicable to claims 38 and 47 as well.

**Appellant's Position Broadly**

In addition to the absence of motivation to combine Ketcham and Pereira as explained above, it is Appellant's position that there is no reasonable expectation of success of the combination in the prior art.

**10 Support for the Positions**

The method of claim 2 receives an aggregated request packet indicating specific PPP sessions of interest and sends an aggregated reply packet containing the status of the sessions of interest indicated in the aggregated request packet.

15 The Examiner relies on Pereira to generate response polls and for router 314 of Ketcham to aggregate the response polls to generate the claimed aggregated reply packet. See the last paragraph of Page 5 of the Final Office Action dated 10/27/2006.

Ketcham teaches in pertinent parts that:

20 A system and method for improving the efficiency of a packet-based network by using aggregate packets are described. One example method involves determining which network devices support aggregate packets. *If a first packet* is received on a route that supports aggregate packets, *it is then held for a short period. During this short period*, if an additional packet is received that shares at least one common route element that also supports aggregate packets with the first packet, the first packet and the additional packet are combined into a single larger aggregate packet.  
25 (Lines 1-11 of Abstract of Ketcham, **Emphasis Added**)s

Thus, the router of Ketcham appears to wait for only a short duration after the reception of a first packet.

Accordingly, for router 314 of Ketcham to indicate the status of the connections (of the aggregate request packet) in a single aggregated reply packet (as claimed), router 314 would need to receive the corresponding status packets from each of the terminals 116 within a time window having a start defined by the time instance at which the first packet is received and the lapse of the short period thereafter, as noted above.

There is no disclosure or suggestion in Ketcham that terminals 116 send status packets to router 314 in such a short duration or that router 314 would use one of the status packets (received from a terminal 116 corresponding to the point-to-point session) as a first packet. It is believed that one or both of these conditions are necessary for router 314 to generate the claimed aggregated reply packet.

Accordingly, the chances of router 314 of Ketcham including in an aggregated reply packet the status of the same set of sessions as those requested in an aggregated request packet, is random.

Therefore, the probability of success of the combination of Ketcham and Pereira operating as in claim 2 is random.

Hence, it is submitted that the combined teachings of Ketcham and Pereira do not establish a *prima facie* case of obviousness under 35 U.S.C. § 103(a) as against the invention of claim 2.

#### **VII. D. Rejection Under 35 U.S.C. § 103(a) - Dependent Claims 3, 22, 39**

Claims 3, 22 and 39 stand rejected as being unpatentable under 35 U.S.C. § 103 over Ketcham in view of Pereira. The Appellant requests the Board to overturn these rejection.

For conciseness, the argument is presented with reference to claim 3 (which depends from claim 1) only. However, the arguments are applicable to claims 22 and 39 as well.

Similar to for reasons noted above with respect to claim 2, the combination or

Ketcham and Pereira would not reasonably suggest (with a probability of success) that an aggregated device would receive an aggregated reply packet in response to sending of an aggregated request packet, with the aggregated request packet indicating the status of at least some of the PPP sessions indicated in the aggregated request packet.

Hence, it is submitted that the combined teachings of Ketcham and Pereira do not establish a prima facie case of obviousness under 35 U.S.C. § 103(a) as against the invention of claim 3.

#### **VII. E. Rejection Under 35 U.S.C. § 103(a) - Dependent Claims 4, 23, 40**

Claims 4, 23 and 40 stand rejected as being unpatentable under 35 U.S.C. § 103 over Ketcham in view of Pereira. The Appellant requests the Board to overturn these rejections.

For conciseness, the argument is presented with reference to claim 4 only. However, the arguments are applicable to claims 23 and 40 as well.

Even if Ketcham and Pereira can be combined as alleged by the Examiner, the combined teachings do not appear to teach or reasonably suggest the claimed feature of, "sending from said aggregation device a proxy keep-alive reply message to one of said plurality of end systems originating a corresponding one of said keep alive-messages ***without waiting for said aggregated reply packet.***" (***Emphasis Added***).

The Examiner relies on Pereira, column 5 lines 45-47 to teach such a feature. This portion of Pereira teaches, "responding to request polls received at the first edge device in the first link session by sending responses to the first end station;".

The above quote merely suggests that the first edge device responds to request polls, but is silent on when the responses are generated.

As noted above, a prima facie case of obviousness requires that each feature be taught by at least one of the references. Here Pereira does not teach the claimed features, contrary

to allegation by the Examiner.

Hence, it is submitted that the combined teachings of Ketcham and Pereira do not establish a *prima facie* case of obviousness under 35 U.S.C. § 103(a) as against the invention of claim 4.

#### **VII. F. Rejection Under 35 U.S.C. § 103(a) - Dependent Claims 5, 17, 24, 41**

Claims 5, 17, 24, and 41 stand rejected under 35 U.S.C. § 103 over Ketcham in view of Pereira, further in view of Chao. The Appellant requests the Board to overturn these rejections.

For conciseness, the argument is presented with reference to claim 5 only. However, the arguments are applicable to claims 17, 24, and 41 as well.

#### **Appellant's Position Broadly**

Even assuming *arguendo* that Chao can be properly combined with the teachings of Pereira and Ketcham, it is respectfully pointed out that the combined teachings of the three references do not teach or reasonably suggest several features of claim 5.

#### **Details of References**

The relevant details of Ketcham and Pereira have been provided above.

Chao generally relates to management of computer networks using dynamic switching between event-driven and polling type of monitoring from manager station. The network is of the type having point-to-point connections between a number of nodes. In the polling mode, a manager coupled to one of the nodes sends a request to an agent in each of the nodes for information about operativeness of the node, its agent, and its connections to other nodes. All of this information is collected to generate a topology map, which may be visually displayed. In the event-monitoring mode, the manager waits for event-messages from the agents in the nodes, to update the topology map. The manager switches from event monitoring mode (which is more efficient) to polling (which is usually more accurate) in

response to a number of factors, including the reachability of the nodes, the manageability of the nodes, and the consistency of information received from various nodes. Reachability is an indication of whether an enabled connection exists from manager to node. Manageability means whether or not the node responds to requests from the manager.

## **Support for the Positions**

Even though Chao discloses a topology map, the combined teachings of the three references does not disclose or reasonably suggest several features of pending claim 5.

For example, pending claim 5 recites that the remote status table indicates the status of sessions supported by the aggregation device. In sharp contrast, the table of Chao is a topology table maintaining connectivity information to different end points.

As may be appreciated the claimed aggregation device may be supporting several point-to-point sessions to the same peer aggregation device, potentially on different paths. At least to that extent, the topology map of Chao is different from the claimed remote status table.

There is no disclosure or suggestion in the art of record to extend (or otherwise modify) topology table of Chao to the claimed remote status. Any such extension/modification would be based on the impermissible hindsight gleaned from the Appellant's disclosure.

As another example, there is no disclosure or suggestion in the three references that the remote status table is updated with the information in the aggregated reply packet, which when read in light of the base claims, requires that the status information be received based on reception of keep-alive messages from the end system.

Chao merely discloses polling and event monitoring based techniques, which are both initiated from within management of Chao, to update the topology table.

The Examiner has not set forth how one skilled in the relevant arts would be motivated to modify or combine the references to operate as in pending claim 5.

Hence, it is submitted that the combined teachings of Ketcham, Chao and Pereira do not establish a *prima facie* case of obviousness under 35 U.S.C. § 103(a) as against the invention of claim 5.

#### **VII. G. Rejection Under 35 U.S.C. § 103(a) - Claims 67-68, 70-71, 73-74, 76-77**

Claims 67, 70, 71, 73, 74, 76, and 77 stand rejected under 35 U.S.C. § 103 over Ketcham in view of Pereira, further in view of Rosenberg. The Appellant requests the Board to overturn these rejections.

For conciseness, the argument is presented with reference to claims 67 and 68 only. However, the arguments are applicable to claims 70, 71, 73, 74, 76, and 77 as well.

Claim 67 recites that "... wherein said generating includes less data in said aggregated request packet than the data forming said plurality of keep-alive messages together."

Such is a result, for example, due to the operation according to claim 68, which recites a specific technique on attaining the feature recited in claim 67.

Claim 68 recites that the identifiers of each session (contained in the received packet) are selected and the aggregated request packet is formed from such identifiers. By selecting the identifiers (which forms a small part of the received keep-alive messages), the size of the aggregated request packet is smaller than the data forming the keep-alive messages together.

In rejecting claims 67 and 68, the Examiner relies on the generalized motivation "... for an improved connection oriented protocol for systems that maintain a number of end users that share a common link." in combining Rosenberg to the previously combined teachings of Ketcham and Pereira.

The Examiner is clearly using impermissible hindsight using the Applicant's disclosure as a recipe in choosing the references and the specific manner in which to combine the references. The alleged combination of the three references suffers from several deficiencies under the applicable rules laid down by the Court of Appeals for the Federal Circuit with respect to a proper *prima facie* case of obviousness under 35 U.S.C. § 103.

For example, Rosenberg is directed to multiplexing real-time transport protocol (RTP) in the context of voice applications and public switched telephone networks (PSTN), which is a different technological area from the other references relied upon in the rejection. The intuitive connection required between the references is simply lacking and thus renders Rosenberg unsuitable for combining with the teachings of Pereira and Ketcham.

Hence, it is submitted that the combined teachings of Ketcham, Rosenberg and Pereira do not establish a *prima facie* case of obviousness under 35 U.S.C. § 103(a) as against the invention of claims 67 and 68.

#### **VII. H. Rejection Under 35 U.S.C. § 103(a) - Dependent Claims 79 - 85**

Claims 79-85 stand rejected as being unpatentable under 35 U.S.C. § 103 over Ketcham in view of Pereira. The Appellant requests the Board to overturn these rejections.

The same claims are also rejected under 35 U.S.C. § 112 as noted above. The Appellants respectfully request this board to decide on this issue assuming the construction (or other alternative acceptable constructions) noted above in addressing the rejection under 35 U.S.C. § 112.

For conciseness, the argument is presented with reference to claim 79 only. However, the arguments are applicable to claims 80-85 as well.

#### **Appellant's Positions Broadly**

It is Appellants position that the art of record, even in combination does not teach or reasonably suggest the feature of "... wherein said receiving, said generating and said sending

are performed in an aggregation device implemented as a single device." recited in claim 79. Any combining of Ketcham and Pereira according to claim 79 would be inconsistent with the operation of Pereira.

### **Support for the Positions**

Once central node 200 of Pereira is combined with router 314 of Ketcham, it is respectfully noted that central node 200 would select polling traffic related to only one of the connection oriented sessions.

In such a scenario, there would not be polling traffic from multiple connection oriented sessions for router 314 to aggregate. Thus, the aggregated request packet would not indicate that the status of multiple PPP sessions is requested.

Accordingly, the Board is respectfully requested to overturn these rejections.

### **VII. I. Rejection Under 35 U.S.C. § 103(a) - Independent Claims 10, 25, 30 and 42**

Claims 10, 25, 30 and 42 stand rejected as being unpatentable under 35 U.S.C. § 103 over Ketcham in view of Pereira. The Appellant requests the Board to overturn these rejections.

For conciseness, the argument is presented with reference to claim 10 only. However, the arguments are applicable to claims 25, 30 and 42 as well.

### **Appellant's Positions Broadly**

In addition to at least some of the reasons noted above with respect to dependent claim 2, it is Appellant's position that the combined teachings of Pereira and Ketcham does not disclose or reasonably suggest the claimed step of "... examining said aggregated request packet to determine that the status of said plurality of point-to-point sessions is requested; ...".

### **Support for the Positions**

The Examiner relies on lines 15-22 Col. 8 of Ketcham for the teaching of the above-noted features. See lines 1-6 of page 7 of the Final Office Action dated 10/17/2006. That portion of Ketcham teaches in relevant parts:

The router 312 receives the aggregate packet 400. The router 312 supports aggregate packets and detects that the aggregate packet 400 is an aggregate packet with an LLC destination other than the router 312 itself. In this case, the router 312 can either hold the packet for further aggregation or immediately send it on. In one embodiment, aggregate packets are not further aggregated. In one embodiment, the aggregate packet 400 is held according to a timer *for further aggregation if the router 312 has setup packet aggregation for packets destined for the router 314.*

In this example, the router 312, routes the aggregate packet 314 to the router 314 without attempting further aggregation. The router 314 receives the aggregate packet 400 and *detects that the packet is an aggregate packet with an LLC destination of the router 314 itself and so the router 314 de-aggregates the aggregate packet 400 and transmits the packets 118-124 to their destinations.* In this example, the packets 118-124 are all sent to the terminal 116.

(Lines 5-22, Col. 8 of Ketcham, *Emphasis Added*)

From the above, it is believed that the examination of packets in router 314 is limited for the purpose of detecting whether the packet is an aggregate packet.

There is no disclosure or suggestion in Ketcham that the content of a received aggregated request packet is examined to determine the specific point-to-point sessions, for which the status is requested.

Accordingly, Appellants respectfully request this Board to overturn the rejection under 35 U.S.C. 103(a) against claim 10.

#### **VII. J. Rejection Under 35 U.S.C. § 103(a) - Dependent Claims 11, 26, 31 and 43**

Claims 11, 26, 31 and 43 stand rejected under 35 U.S.C. § 103 over Ketcham in view of Pereira, further in view of Chao. The Appellant requests the Board to overturn these rejections.

For conciseness, the argument is presented with reference to claim 11 only. However, the arguments are applicable to claims 26, 31 and 43 as well.

In particular, it is Appellant's position that the art of record, even in combination, does not teach or reasonably suggest the feature of, "accessing a local status table which contains the status information of at least some of said plurality of point-to-point sessions".

In support of the position Appellant notes that the recipient router 314 of Ketcham forwards the individual packets in a received aggregate packet to the respective individual terminals. In addition, it is believed that in the Examiner's construction of the combination of Ketcham and Pereira, router 314 would rely on status packets received from external to router 314.

Such a construction would be inconsistent with the claimed feature of "accessing a local status table which contains the status information of at least some of said plurality of point-to-point sessions" to determine the status of the point-to-point sessions.

Thus, it is Appellant's position that the combined teachings of the art of record either do not teach one or more features of claim 11 or there is no motivation in the art of record to combine the references as alleged by the Examiner.

Accordingly, Appellants respectfully request this Board to overturn the rejection under 35 U.S.C. 103(a) against claim 11.

#### **VII. K. Rejection Under 35 U.S.C. § 103(a) - Remaining dependent Claims**

The remaining dependent claims are unobvious at least as depending from the unobvious base claims.

#### **VII. L. Conclusion**

Appellants thus submit that the Examiner has not established a prima facie case of obviousness under 35 U.S.C. § 103 against any of the claims. Accordingly, Appellants respectfully request the reversal of all the rejections under 35 U.S.C. § 103. The Appellants similarly request reversal of the rejections under 35 U.S.C. § 112 at least for reasons noted above.

Revised Appeal brief dated 08/27/2007

Appl. No.: 09/785,884  
Attorney Docket No.: CSCO-002/94701

Respectfully submitted,  
/Narendra Reddy Thappeta/  
Signature

Printed Name: Narendra Reddy Thappeta  
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Registration Number: 41,416

Date: April 17, 2007

**VIII. Listing of Claim**

1       Claim 1 (Previously Presented): A method of processing a plurality of keep-alive  
2 messages generated by a corresponding plurality of end systems, each of said plurality of  
3 keep-alive messages being designed to request the status of a corresponding point to point  
4 (PPP) session implemented on a communication network, said method comprising:

5           receiving in an aggregation device said plurality of keep-alive messages;  
6           generating in said aggregation device an aggregated request packet which includes  
7 data indicating that the status of said PPP sessions is requested; and  
8           sending said aggregated request packet to a peer aggregation device.

1       Claim 2 (Original): The method of claim 1, further comprising:  
2           receiving said aggregated request packet in said peer aggregation device;  
3           indicating the status of said plurality of sessions in an aggregated reply packet; and  
4           sending said aggregated reply packet to said aggregation device.

1       Claim 3 (Original): The method of claim 1, further comprising receiving in said  
2 aggregation device an aggregated reply packet from said peer aggregation device, wherein  
3 said aggregated reply packet indicates the status of at least some of said plurality of PPP  
4 sessions.

1       Claim 4 (Previously Presented): The method of claim 3, further comprising sending  
2 from said aggregation device a proxy keep-alive reply message to one of said plurality of end  
3 systems originating a corresponding one of said keep alive-messages without waiting for said  
4 aggregated reply packet.

1       Claim 5 (Original): The method of claim 4, further comprising:  
2           maintaining a remote status table in said aggregation device, wherein said remote  
3 status table indicates the status of sessions supported by said aggregation device;  
4           updating said remote status table with the information in said aggregated reply packet;  
5           and  
6           generating said proxy keep-alive reply according to said remote status table.

1       Claim 6 (Original): The method of claim 5, wherein said proxy keep-alive message  
2 indicates that the corresponding session is alive/OK when a first keep-alive message is  
3 received for the corresponding session.

1       Claim 7 (Original): The method of claim 6, further comprising initializing the status  
2 of each of said session to alive/OK such that said proxy keep-alive message in response to  
3 said first keep-alive message indicates alive/OK status.

1       Claim 8 (Original): The method of claim 1, wherein said communication network is  
2 implemented using one of frame relay, ATM and IP networks.

1       Claim 9 (Original): The method of claim 1, wherein said aggregation device is one  
2 of a network access server and home gateway.

1       Claim 10 (Previously Presented): A method of processing an aggregated request  
2 packet in an aggregation device, wherein said aggregated request packet is received from a  
3 peer aggregation device and indicates that the status of a plurality of point-to-point sessions  
4 is requested, said method comprising:

5           examining said aggregated request packet to determine that the status of said plurality  
6 of point-to-point sessions is requested;

7           determining the status of each of said plurality of point-to-point sessions;

8           generating an aggregated reply packet indicating the status of said plurality of point-  
9 to-point sessions; and

10          sending said aggregated reply packet to said peer aggregation device.

1       Claim 11 (Original): The method of claim 10, wherein said determining comprises  
2 accessing a local status table which contains the status information of at least some of said  
3 plurality of point-to-point sessions.

1       Claim 12 (Original): The method of claim 10, wherein said generating comprises

2 including a client magic number associated with each of said plurality of point-to-point  
3 sessions.

1       Claim 13 (Original): The method of claim 10, wherein said generating comprises  
2 setting a bit to one logical value to indicate that a corresponding one of said plurality of  
3 sessions is OK/alive, and to another logical value to indicate that said corresponding one of  
4 said plurality of session not OK/alive.

1       Claim 14 (Original): The method of claim 10, wherein said aggregation device  
2 comprises one of a network access server (NAS) and a home gateway implemented in a  
3 communication network.

1       Claim 15 (Previously Presented): An aggregation device for processing a plurality of  
2 keep-alive messages generated by a corresponding plurality of end systems, each of said  
3 plurality of keep-alive messages being designed to request the status of a corresponding point  
4 to point (PPP) session implemented on a communication network, said aggregation device  
5 comprising:

6           an input interface receiving said plurality of keep-alive messages;  
7           a message aggregator coupled to said input interface, said message aggregator  
8 examining said plurality of messages and generating data according to a format indicating  
9 that the status of said PPP sessions is requested; and

10          an output interface sending an aggregated request packet on said communication  
11 network to a peer aggregation device, said aggregated request packet containing said data  
12 generated by said message aggregator.

1       Claim 16 (Original): The aggregation device of claim 15, further comprising an  
2 encapsulator encapsulating said data in a packet suitable for transmission on said  
3 communication network.

1       Claim 17 (Original): The aggregation device of claim 16, further comprising:  
2           a remote status table indicating the status of sessions supported by said aggregation

3 device; and

4 a de-aggregator receiving an aggregated reply packet from said peer aggregation  
5 device, wherein said aggregated reply packet indicates the status of at least some of said  
6 plurality of PPP sessions, said de-aggregator updating said remote status table with the  
7 information in said aggregated reply packet.

1 Claim 18 (Original): The aggregation device of claim 17, further comprising a proxy  
2 reply unit sending a proxy keep-alive reply message to one of said plurality of end systems  
3 originating a corresponding one of said keep alive-messages without waiting for said  
4 aggregated reply packet.

1 Claim 19 (Original): The invention of claim 18, wherein said aggregation device  
2 comprises a network access server.

1 Claim 20 (Original): The aggregation device of claim 18, wherein said aggregated  
2 request packet contains a magic number related to each of the corresponding sessions.

1 Claim 21 (Previously Presented): An aggregation device for processing a plurality of  
2 keep-alive messages generated by a corresponding plurality of end systems, each of said  
3 plurality of keep-alive messages being designed to request the status of a corresponding point  
4 to point (PPP) session implemented on a communication network, said aggregation device  
5 comprising:

6 first means for receiving said plurality of keep-alive messages;

7 means for generating an aggregated request packet which includes data indicating that  
8 the status of said PPP sessions is requested; and

9 means for sending said aggregated request packet to a peer aggregation device.

1 Claim 22 (Original): The aggregation device of claim 21, further comprising second  
2 means for receiving an aggregated reply packet from said peer aggregation device, wherein  
3 said aggregated reply packet indicates the status of at least some of said plurality of PPP  
4 sessions.

1       Claim 23 (Original): The aggregation device of claim 22, further comprising means  
2 for sending a proxy keep-alive reply message to one of said plurality of end systems  
3 originating a corresponding one of said keep alive-messages without waiting for said  
4 aggregated reply packet.

1       Claim 24 (Original): The aggregation device of claim 23, further comprising:  
2           means for maintaining a remote status table in said aggregation device, wherein said  
3 remote status table indicates the status of sessions supported by said aggregation device;  
4           means for updating said remote status table with the information in said aggregated  
5 reply packet; and  
6           means for generating said proxy keep-alive reply according to said remote status table.

1       Claim 25 (Previously Presented): An aggregation device for processing an aggregated  
2 request packet, wherein said aggregated request packet is received from a peer aggregation  
3 device and indicates that the status of a plurality of point-to-point sessions are requested, said  
4 aggregation device comprising:

5           means for examining said aggregated request packet to determine that the status of  
6 said plurality of point-to-point sessions is requested;  
7           means for determining the status of each of said plurality of point-to-point sessions;  
8           means for generating an aggregated reply packet indicating the status of said plurality  
9 of point-to-point sessions; and  
10          means for sending said aggregated reply packet to said peer aggregation device.

1       Claim 26 (Original): The aggregation device of claim 25, wherein said means for  
2 determining comprises means for accessing a local status table which contains the status  
3 information of at least some of said plurality of point-to-point sessions.

1       Claim 27 (Original): The aggregation device of claim 25, wherein said means for  
2 generating includes a client magic number associated with each of said plurality of point-to-  
3 point sessions.

4       Claim 28 (Original): The aggregation device of claim 25, wherein said means for  
5 generating sets a bit in said aggregated reply packet to one logical value to indicate that a  
6 corresponding one of said plurality of sessions is OK/alive, and to another logical value to  
7 indicate that said corresponding one of said plurality of session not OK/alive.

1       Claim 29 (Original): The aggregation device of claim 25, wherein said aggregation  
2 device comprises one of a network access server (NAS) and a home gateway implemented  
3 in a communication network.

1       Claim 30 (Previously Presented): An aggregation device for processing an aggregated  
2 request packet, wherein said aggregated request packet is received from a peer aggregation  
3 device and indicates that the status of a plurality of point-to-point sessions are requested, said  
4 aggregation device comprising:

5           an input interface receiving said aggregated request packet;

6           a de-encapsulator examining said aggregated request packet to determine that the  
7 status of said plurality of point-to-point sessions is requested;

8           a reply generator determining the status of each of said plurality of point-to-point  
9 sessions, and generating an aggregated reply packet indicating the status of each of said  
10 plurality of point-to-point sessions; and

11          an output interface sending said aggregated reply packet to said peer aggregation  
12 device.

1       Claim 31 (Original): The aggregation device of claim 30, further comprising a local  
2 status table storing the status information of at least some of said plurality of point-to-point  
3 sessions, wherein said reply generator determines the status of said at least some of said  
4 plurality of point-to-point sessions by accessing said local status table.

1       Claim 32 (Original): The aggregation device of claim 31, further comprising a session  
2 manager updating the status of said plurality of point-to-point sessions in said local status  
3 table.

1       Claim 33 (Original): The aggregation device of claim 30, wherein said reply generator  
2 includes in said aggregated reply packet a client magic number associated with each of said  
3 plurality of point-to-point sessions.

1       Claim 34 (Original): The aggregation device of claim 30, wherein said reply generator  
2 sets a bit in said aggregated reply packet to one logical value to indicate that a corresponding  
3 one of said plurality of sessions is OK/alive, and to another logical value to indicate that said  
4 corresponding one of said plurality of session not OK/alive.

1       Claim 35 (Original): The aggregation device of claim 30, further comprising a keep-  
2 alive processor coupled to said de-encapsulator, wherein said keep-alive processor examines  
3 said aggregated request packet to determine that status of point-to-point sessions is requested  
4 and causes said reply generator to generate said aggregated reply packet.

1       Claim 36 (Original): The aggregation device of claim 30, wherein said aggregation  
2 device comprises one of a network access server (NAS) and a home gateway implemented  
3 in a communication network.

1       Claim 37 (Previously Presented): A computer-readable medium carrying one or more  
2 sequences of instructions for causing a aggregation device to process a plurality of keep-alive  
3 messages generated by a corresponding plurality of end systems, each of said plurality of  
4 keep-alive messages being designed to request the status of a corresponding point to point  
5 (PPP) session implemented on a communication network, wherein execution of said one or  
6 more sequences of instructions by one or more processors contained in said aggregation  
7 device causes said one or more processors to perform the actions of:

8           receiving in an aggregation device said plurality of keep-alive messages;  
9           generating in said aggregation device an aggregated request packet which includes  
10 data indicating that the status of said PPP sessions is requested; and  
11 sending said aggregated request packet to a peer aggregation device.

1       Claim 38 (Original): The computer-readable medium of claim 37, further comprising:

2 receiving said aggregated request packet in said peer aggregation device;  
3 indicating the status of said plurality of sessions in an aggregated reply packet; and  
4 sending said aggregated reply packet to said aggregation device.

1       Claim 39 (Original): The computer-readable medium of claim 37, further comprising  
2 receiving in said aggregation device an aggregated reply packet from said peer aggregation  
3 device, wherein said aggregated reply packet indicates the status of at least some of said  
4 plurality of PPP sessions.

1       Claim 40 (Original): The computer-readable medium of claim 39, further comprising  
2 sending a proxy keep-alive reply message to one of said plurality of end systems originating  
3 a corresponding one of said keep alive-messages without waiting for said aggregated reply  
4 packet.

1       Claim 41 (Original): The computer-readable medium of claim 40, further comprising:  
2 maintaining a remote status table in said aggregation device, wherein said remote  
3 status table indicates the status of sessions supported by said aggregation device;  
4 updating said remote status table with the information in said aggregated reply packet;  
5 and generating said proxy keep-alive reply according to said remote status table.

1       Claim 42 (Previously Presented): A computer-readable medium carrying one or more  
2 sequences of instructions for causing an aggregation device to process an aggregated request  
3 packet, wherein said aggregated request packet is received from a peer aggregation device  
4 and indicates that the status of a plurality of point-to-point sessions are requested, wherein  
5 execution of said one or more sequences of instructions by one or more processors contained  
6 in said aggregation device causes said one or more processors to perform the actions of:

7           examining said aggregated request packet to determine that the status of said plurality  
8 of point-to-point sessions is requested;  
9           determining the status of each of said plurality of point-to-point sessions;  
10          generating an aggregated reply packet indicating the status of said plurality of point-  
11 to-point sessions; and

12 sending said aggregated reply packet to said peer aggregation device.

1       Claim 43 (Original):The computer-readable medium of claim 42, wherein said  
2 determining comprises accessing a local status table which contains the status information  
3 of at least some of said plurality of point-to-point sessions.

1       Claim 44 (Original): The computer-readable medium of claim 42, wherein said  
2 generating comprises including a client magic number associated with each of said plurality  
3 of point-to-point sessions.

1       Claim 45 (Original): The computer-readable medium of claim 42, wherein said  
2 generating comprises setting a bit to one logical value to indicate that a corresponding one  
3 of said plurality of sessions is OK/alive, and to another logical value to indicate that said  
4 corresponding one of said plurality of session not OK/alive.

1       Claim 46 (Original): The computer-readable medium of claim 42, wherein said  
2 aggregation device comprises one of a network access server (NAS) and a home gateway  
3 implemented in a communication network.

1       Claim 47 (Previously Presented): A communication network comprising:  
2           a first aggregation device receiving a plurality of keep-alive messages generated by  
3           a corresponding plurality of end systems, each of said plurality of keep-alive messages being  
4           designed to request the status of a corresponding point to point (PPP) session implemented  
5           on said communication network, said first aggregation device generating an aggregated  
6           request packet which includes data indicating that the status of said PPP sessions is requested,  
7           and sending said aggregated request packet; and

8           a peer aggregation device receiving said aggregated request packet and indicating the  
9           status of said plurality of sessions in an aggregated reply packet, said peer aggregation packet  
10          sending said aggregated reply packet to said first aggregation device,

11          wherein each of said first aggregation device and said peer aggregation device is  
12          implemented as a single device.

13        Claim 48 (Previously Presented): The communication network of claim 47, wherein  
14    said first aggregation device is located at an edge of said communication networks.

1            Claim 49 (Previously Presented): The communication network of claim 48, further  
2    comprising an access network coupling said first aggregation device to said corresponding  
3    plurality of end systems, wherein said plurality of keep-alive messages are received on said  
4    access network.

1            Claim 50 (Previously Presented): The communication network of claim 49, wherein  
2    said first aggregation device and said peer aggregation device respectively comprise a  
3    network access server (NAS); and a home gateway.

1            Claims 51 - 58 (Canceled):

1            Claim 59 (Previously Presented): The method of claim 1, wherein said aggregation  
2    device is physically separate from said plurality of end systems.

1            Claim 60 (Previously Presented): The method of claim 10, wherein said aggregation  
2    device is physically separate from said plurality of end systems.

1            Claims 61 - 66 (Canceled)

1            Claim 67 (Previously Presented): The method of claim 1, wherein said generating  
2    includes less data in said aggregated request packet than the data forming said plurality of  
3    keep-alive messages together.

1            Claim 68 (Previously Presented): The method of claim 67, wherein each of said  
2    plurality of keep-alive messages contains an identifier of a corresponding PPP session,  
3    wherein said generating comprises:

4            selecting said identifier of each of said plurality of keep-alive messages; and  
5            forming said aggregated request packet from said identifiers,

6        whereby said aggregated request packet contains less data than said plurality of keep-  
7        alive messages together.

8            Claim 69 (Previously Presented): The method of claim 1, wherein each of said PPP  
9        sessions terminates at a home gateway, and wherein said aggregation device comprises a  
10      switching device and is in the path of each of said PPP sessions from a corresponding one of  
11      said plurality of end systems to said home gateway.

1            Claim 70 (Previously Presented): The aggregation device of claim 30, wherein said  
2        reply generator includes less data in said aggregated request packet than the data forming said  
3        plurality of keep-alive messages together.

1            Claim 71 (Previously Presented): The aggregation device of claim 70, wherein each  
2        of said plurality of keep-alive messages contains an identifier of a corresponding PPP session,  
3        wherein said reply generator operates to:

4                select said identifier of each of said plurality of keep-alive messages; and  
5                form said aggregated request packet from said identifiers,  
6        whereby said aggregated request packet contains less data than said plurality of keep-  
7        alive messages together.

8            Claim 72 (Previously Presented): The aggregation device of claim 30, wherein each  
9        of said PPP sessions terminates at a home gateway, and wherein said aggregation device  
10      comprises a switching device and is in the path of each of said PPP sessions from a  
11      corresponding one of said plurality of end systems to said home gateway.

1            Claim 73 (Previously Presented): The computer readable medium of claim 37,  
2        wherein said generating includes less data in said aggregated request packet than the data  
3        forming said plurality of keep-alive messages together.

1       Claim 74 (Previously Presented): The computer readable medium of claim 73,  
2 wherein each of said plurality of keep-alive messages contains an identifier of a  
3 corresponding PPP session, wherein said generating comprises:

4           selecting said identifier of each of said plurality of keep-alive messages; and  
5           forming said aggregated request packet from said identifiers,  
6           whereby said aggregated request packet contains less data than said plurality of keep-  
7 alive messages together.

8       Claim 75 (Previously Presented): The computer readable medium of claim 37,  
9 wherein each of said PPP sessions terminates at a home gateway, and wherein said  
10 aggregation device comprises a switching device and is in the path of each of said PPP  
11 sessions from a corresponding one of said plurality of end systems to said home gateway.

1       Claim 76 (Previously Presented): The aggregation device of claim 21, wherein said  
2 means for generating includes less data in said aggregated request packet than the data  
3 forming said plurality of keep-alive messages together.

1       Claim 77 (Previously Presented): The aggregation device of claim 76 wherein each  
2 of said plurality of keep-alive messages contains an identifier of a corresponding PPP session,  
3 wherein said means for generating operates to:

4           select said identifier of each of said plurality of keep-alive messages; and  
5           form said aggregated request packet from said identifiers,  
6           whereby said aggregated request packet contains less data than said plurality of keep-  
7 alive messages together.

1       Claim 78 (Previously Presented): The aggregation device of claim 21, wherein each  
2 of said PPP sessions terminates at a home gateway, and wherein said aggregation device  
3 comprises a switching device and is in the path of each of said PPP sessions from a  
4 corresponding one of said plurality of end systems to said home gateway.

1       Claim 79 (Previously Presented): The method of claim 1, wherein said receiving, said  
2 generating and said sending are performed in an aggregation device implemented as a single  
3 device.

1       Claim 80 (Previously Presented): The method of claim 10, wherein said examining,  
2 said determining, said generating and said sending are performed in said aggregation device  
3 implemented as a single device.

1       Claim 81 (Previously Presented): The aggregation device of claim 21, wherein said  
2 means for receiving, said means for generating and said means for sending are contained in  
3 said aggregation device implemented as a single device.

1       Claim 82 (Previously Presented): The aggregation device of claim 25, wherein said  
2 means for examining, said means for determining, said means for generating and said means  
3 for sending are implemented in said aggregation device implemented as a single device.

1       Claim 83 (Previously Presented): The aggregation device of claim 30, wherein said  
2 input interface, said de-encapsulator, said reply generator and said output interface are  
3 contained in said aggregation device implemented as a single device.

1       Claim 84 (Previously Presented): The computer readable medium of claim 37,  
2 wherein said receiving, said generating and said sending are performed by said aggregation  
3 device implemented as a single device.

1       Claim 85 (Previously Presented): The computer readable medium of claim 42,  
2 wherein said examining, said determining, said generating and said sending are performed  
3 by said aggregation device implemented as a single device.

**IX. APPENDIX**

- A. EVIDENCE APPENDIX: None
- B. RELATED PROCEEDINGS APPENDIX: None